First Quarterly Groundwater Monitoring Report

Former Griffin Wheel Brass Foundry
Tacoma, Washington

Amsted Industries
Chicago, Illinois

K/J 926061.00
5 April 1993

Kennedy/Jenks Consultants

Kennedy/Jenks Consultants

Engineers and Scientists

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6 April 1993

Mr. Loren McPhillips
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Subject: First Quarterly Groundwater Monitoring Report
Former Griffin Wheel Brass Foundry - Tacoma, Washington
Amsted Industries
K/J 926061.00

Dear Mr. McPhillips:

In accordance with our agreement with Amsted Industries (Amsted) and the *Final Groundwater Monitoring Program Work Plan of February 1993*, this letter report presents the First Quarterly Groundwater Monitoring Report and outlines the results of Kennedy/Jenks Consultants' groundwater monitoring activities at Amsted's former Brass Foundry (Griffin Wheel Brass Foundry).

This letter report includes:

- A summary and description of monitoring activities performed at the former Griffin Wheel Brass Foundry site
- Water level elevations of onsite groundwater monitoring wells
- A brief discussion of local hydrogeology relative to other investigations performed at the former Griffin Wheel Brass Foundry site, including groundwater flow direction and contour map
- Observations of floating product

- Groundwater sampling procedures and field parameters
- A summary of analytical results.

FIELD MONITORING ACTIVITIES

Kennedy/Jenks Consultants personnel performed the following groundwater monitoring activities at the former Griffin Wheel Brass Foundry site on 17 February 1993:

- Measured water levels in groundwater monitoring wells NMW-8, NMW-9, NMW-10, NMW-11, NMW-12, NMW-13, NMW-14, MW-1A, and MW-3A
- Inspected the monitoring wells (listed above) for the presence of floating product
- Recovered floating product from groundwater monitoring well NMW-13
- Collected groundwater samples from monitoring wells NMW-8, NMW-9, NMW-10, NMW-11, NMW-12, NMW-13, and NMW-14.

The groundwater wells were resampled on 2 March 1993, due to laboratory contamination. During resampling, monitoring wells were inspected again for the presence of floating product. Floating product was also recovered from well NMW-13 at this time.

WATER LEVEL ELEVATIONS

Water level measurements were performed at groundwater monitoring wells NMW-8, NMW-9, NMW-10, NMW-11, NMW-12, NMW-13, NMW-14, MW-1A, and MW-3A. The location of these wells is shown on Figure 1A (Attachment 1). Water level measurements were performed by procedures specified in the Final Work Plan. Water level elevations are presented in Table 1A (Attachment 2).

HYDROGEOLOGIC CONDITIONS

Groundwater elevations were contoured using PC TIN 3.4D and ARC/INFO 3.4D computer software. The contour map (Figure 1A - Attachment 1) shows the groundwater surface of onsite monitoring wells. The groundwater flow direction and gradient near the location of the former underground storage tank (UST) were estimated from the contour map.

The estimated groundwater flow is in a northwest direction (north 42 degrees west); the estimated groundwater gradient is 0.0020 ft/ft. These values are consistent with previous calculated flow direction and gradient data presented in the *Subsurface Investigation, Former Griffin Wheel Brass Foundry, South Tacoma Field Superfund Site, Tacoma, Washington*, dated December 1992 by Kennedy/Jenks Consultants.

OBSERVATION OF FLOATING PRODUCT

All onsite wells were monitored and visually inspected for the presence of floating product on the water table surface. The procedures for observing and monitoring the wells entailed affixing an oil absorbent material to a water level probe and placing the

probe in the well at the groundwater surface. The absorbent material was then visually inspected for the presence of floating product.

Floating product was observed in well NMW-13 during both monitoring events. The floating product was recovered from this well by affixing oil absorbent material to a weighted string and placing the weighted string into the well at the groundwater surface. This procedure was repeated four times, until no floating product was observed on the absorbent material. Floating product was observed on only portions of the absorbent material during the recovery procedure. The amount of floating product affixed to the absorbent material diminished with each subsequent application of this procedure.

GROUNDWATER SAMPLING

Groundwater samples were collected from wells NMW-8, NMW-9, NMW-10, NMW-11, NMW-12, NMW-13, and NMW-14 and analyzed for total petroleum hydrocarbons (TPH) by Washington State Method WTPH-D and for polynuclear aromatic hydrocarbons (PAH) by U.S. Environmental Protection Agency (EPA) Method 8310. Due to laboratory contamination of the samples for TPH analyses, the monitoring wells were resampled 2 March 1993. The samples collected 2 March 1993 were analyzed only for TPH by Washington State Method WTPH-D because the previous samples analyzed for PAH analyses were not impacted by the laboratory contamination.

Groundwater sampling was performed as specified in the Final Work Plan during both events. Prior to purging and sampling the wells, the dedicated pumps were raised within the casing so that the top of the pump was within approximately 1 foot of the static water level.

Field parameters, including pH, temperature, and conductivity, were measured and recorded during both groundwater sampling events. The field parameters for both sampling events are summarized in Tables 2A1 and 2A2 (Attachment 2). Groundwater purge and sampling forms for both events are presented in Attachment 3.

One field duplicate sample and one field blank sample were collected during each sampling event. The field duplicate and blank samples were analyzed for the same analytes as the groundwater samples (TPH and PAH). Analytical results are summarized in Table 3A (Attachment 2). Complete analytical results (including quality assurance data) are maintained in the project file and are available upon request.

SUMMARY OF ANALYTICAL RESULTS

Analytical data generated by the laboratory was reviewed to assess the laboratory's performance in meeting the quality control specifications for detection limits, accuracy, precision, and completeness. The WTPH-D surrogate percent recoveries for two samples (sample 1795 and the field blank) did not meet the method control limits. The PAH surrogate percent recovery for sample 1791 also did not meet the laboratory control limit. The laboratory noted this in their case narratives and stated that re-extraction and analyses of the samples was not possible because there was an insufficient amount of sample. To ensure this situation does not recur, double or triple sample volumes will be collected and submitted to the laboratory for subsequent sampling events. All other data quality control criteria (i.e., matrix spike recoveries, relative percent differences, method blank analyses) were met.

Several non-carcinogenic PAH compounds were detected in well NMW-13. Concentrations of all detected compounds were less than 1 μg/L. The detected compounds were similar to compounds detected in well NMW-13 during the previous sampling of the

well in September 1992. However, in general, concentrations detected during the first quarterly sampling event were less than concentrations detected during the September sampling event. A comparison of compounds detected in well NMW-13 from the two sampling events is shown in Table 4A (Attachment 2). PAHs were not detected in any of the other groundwater monitoring wells sampled.

TPHs were detected in well NMW-13 at a concentration of 0.7 mg/L (the duplicate sample concentration was 0.8 mg/L). TPHs were not detected in well NMW-13 during the September sampling event. However, groundwater water samples collected in September were analyzed for TPH by Washington State Method WTPH-418.1. (Groundwater samples collected during the first quarter of groundwater sampling were analyzed for TPH by Washington State Method WTPH-D.) TPH were not detected in any of the other sampled groundwater monitoring wells.

The second quarter of groundwater monitoring is scheduled for May 1993. EPA will be contacted prior to this event.

Please contact us at (206) 874-0555 if you have any questions regarding the information presented herein.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Julie A. Reid, CHMM
Project Engineer

Nathan A. Graves
Vice Present

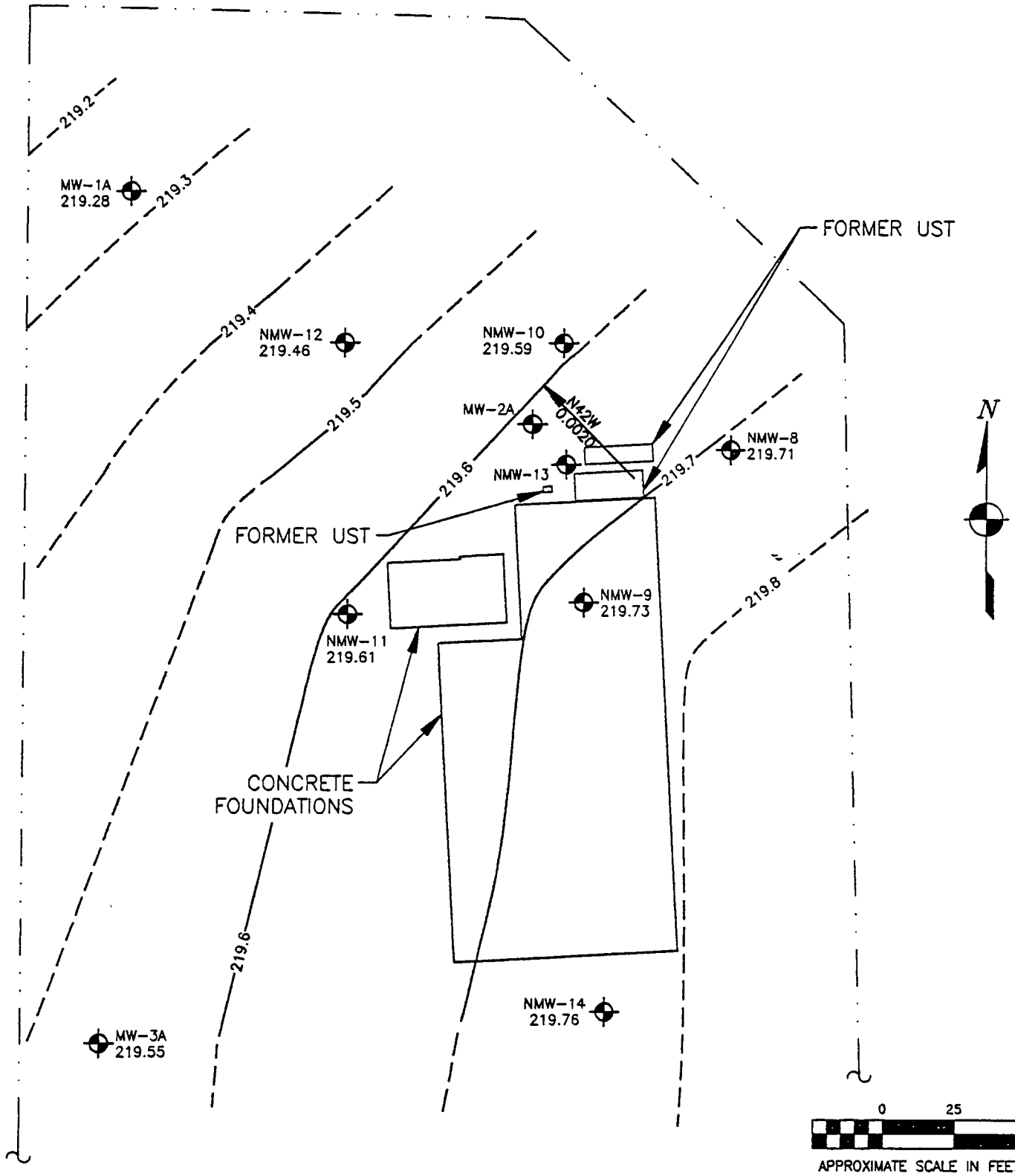
JAR:NAG/dfb
4jar1

Enclosures

cc: Edward Brosius, Amsted Industries
Bill Joyce, Ogden Murphy & Wallace
John Frerich, ICF Technology, Inc.
Chris Poindexter, Washington State Department of Ecology

Attachment 1

Figure



LEGEND

MW-3A 219.55 — MONITORING WELL LOCATION WITH WATER LEVEL ELEVATION IN FEET ABOVE MEAN SEA LEVEL (CITY OF TACOMA NGVD 29 VERTICAL DATUM).

219.4 — APPROXIMATE WATER LEVEL ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL.

N42W 0.0020 — ESTIMATED GROUNDWATER FLOW DIRECTION AND GRADIENT.

Kennedy/Jenks Consultants

AMSTED INDUSTRIES
TACOMA, WA

WATER LEVEL CONTOUR MAP
FEBRUARY 1993

926061.00/P3SK004

FIGURE 1A

Attachment 2

Tables

TABLE 1A[a]

GROUNDWATER LEVEL MEASUREMENTS
FIRST QUARTER - FEBRUARY MONITORING EVENT
Former Griffin Wheel Brass Foundry

Well No.	Location No.	Top of Monument Elevation (feet)[b]	Depth of Water (feet)[c]	Water Level Elevation (feet)
NMW-8	1789	252.94	33.23	219.71
NMW-9	1790	253.79	34.06	219.73
NMW-10	1791	253.49	33.90	219.59
NMW-11	1792	252.28	32.67	219.61
NMW-12	1793	252.49	33.03	219.46
NMW-13	1794	252.76	31.60	221.16
NMW-14	1795	249.34	29.58	219.76
MW-1A	1773	243.62	24.34	219.28
MW-3A	1775	240.64	21.09	219.55

Notes:

(a) Tables in the Quarterly Groundwater Monitoring Reports will be labeled A for the first quarter, B for the second quarter, C for the third quarter, and D for the fourth quarter to differentiate between the four quarters of groundwater monitoring.
(b) Elevations are given in feet and are based on City of Tacoma vertical datum.
(c) Depth to water is measured from top of the steel well monument.

TABLE 2A1

SUMMARY OF GROUNDWATER MONITORING ACTIVITIES
FIRST QUARTER - FEBRUARY MONITORING EVENT
Former Griffin Wheel Brass Foundry

Well Number	Sample Identification	Date	Time	Water Depth[a] (feet)	Product Observed	Sampling Method[b]	Duration of Purge (minutes)	Water Volume Removed (gallons)	Well Volumes Removed	Conductivity (μmhos/cm)	pH (units)	Temperature (° celsius)	Relative Turbidity/Color[c]	Well Dewatered
NMW-8	1789GU000000000.010	02/17/93	1225	33.23	No	Sub. Pump	20	9.0	5.2	188	6.59	12.8	Clear	No
NMW-9	1790GU000000000.010	02/17/93	1425	34.06	No	Sub. Pump	52	22	3.0	332	6.66	11.7	Clear	No
NMW-10	1791GU000000000.010	02/17/93	1100	33.90	No	Sub. Pump	19	6.5	3.9	228	6.43	12.3	Slight/Gray	No
NMW-11	1792GU000000000.010	02/17/93	1135	32.67	No	Sub. Pump	18	9.0	4.9	449	6.84	12.5	Slight/Gray	No
NMW-12	1793GU000000000.010	02/17/93	1010	33.03	No	Sub. Pump	20	7.0	4.0	302	6.62	11.8	Clear	No
NMW-13	1794GU201000000.010 2001GU202000000.010[d]	02/17/93	1555	31.60	Yes	Sub. Pump	43	48	3.0	308	6.61	13.0	Clear	No
NMW-14	1795GU000000000.010	02/17/93	0925	29.58	No	Sub. Pump	23	9.0	3.9	318	6.74	11.4	Slight/Yellow	No
MW-1A	NS[e]	02/17/93	0850	24.34	No	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3A	NS	02/17/93	0840	21.09	No	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

(a) Depth measured from top of well monument.
(b) All wells were sampled with a submersible pump.
(c) Relative turbidity was determined through visual observation.
(d) A duplicate groundwater sample was collected at well NMW-13.
(e) NS - Not sampled. The water levels of monitoring wells MW-1A and MW-3A were measured and the wells were visually observed for the presence of product.

TABLE 2A2

SUMMARY OF GROUNDWATER MONITORING ACTIVITIES
FIRST QUARTER - MARCH MONITORING EVENT
Former Griffin Wheel Brass Foundry

Well Number	Sample Identification	Date	Time	Water Depth[a] (feet)	Product Observed	Sampling Method[b]	Duration of Purge (minutes)	Water Volume Removed (gallons)	Well Volumes Removed	Conductivity (μmhos/cm)	pH (units)	Temperature (° celsius)	Relative Turbidity/Color[c]	Well Dewatered
NMW-8	1789GU000000000.010	03/02/93	1200	33.44	No	Sub. Pump	22	5.0	3.0	188	6.00	13.1	Slight/Gray	No
NMW-9	1790GU000000000.010	03/02/93	1320	34.25	No	Sub. Pump	25	20	3.0	338	6.33	13.5	Clear	No
NMW-10	1791GU000000000.010	03/02/93	1030	34.15	No	Sub. Pump	28	5.0	3.1	238	6.06	12.0	Slight/Gray	No
NMW-11	1792GU000000000.010	03/02/93	1115	32.88	No	Sub. Pump	23	5.0	2.8	450	6.35	12.9	Clear	No
NMW-12	1793GU000000000.010	03/02/93	0945	33.27	No	Sub. Pump	23	6.0	3.5	257	6.44	11.8	Clear	No
NMW-13	1794GU201000000.010 2001GU202000000.010[d]	03/02/93	1500	32.20	Yes	Sub. Pump	54	52	3.0	339	6.25	13.5	Clear	No
NMW-14	1795GU000000000.010	03/02/93	0855	27.50	No	Sub. Pump	35	8.0	3.0	297	6.48	12.2	Slight/Yellow	No
MW-1A	NS[e]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

(a) Depth measured from top of well monument.
(b) All wells were sampled with a submersible pump.
(c) Relative turbidity was determined through visual observation.
(d) A duplicate groundwater sample was collected at well NMW-13.
(e) NS - Not sampled. The water levels of monitoring wells MW-1A and MW-3A were measured and the wells were visually observed for the presence of product.

TABLE 3A

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
FIRST QUARTER - FEBRUARY AND MARCH MONITORING EVENT
Former Griffin Wheel Brass Foundry

Well Number (Location Number)	PAH Analytes[a] (µg/L)						TPH[b] (mg/L)
	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	
NMW-8 (1789)	<0.51[c]	<0.10	<0.051	<0.051	<0.10	<0.10	<0.3
NMW-9 (1790)	<0.50	<0.10	<0.050	<0.050	<0.10	<0.10	<0.3
NMW-10 (1791)	<0.50	<0.10	<0.050	<0.050	<0.10	<0.10	<0.3
NMW-11 (1792)	<0.50	<0.10	<0.050	<0.050	<0.10	<0.10	<0.3
NMW-12 (1793)	<0.50	<0.10	<0.050	<0.050	<0.10	<0.10	<0.3
NMW-13 (1794/2001)[d]	<0.51/0.84	0.27/0.44	0.37/0.16	0.099/0.085	0.73/0.84	0.69/0.45	0.7/0.8
NMW-14 (1795)	<0.50	<0.10	<0.050	<0.050	<0.10	<0.10	<0.3
Field Blank (3740)	<0.50	<0.10	<0.050	<0.050	<0.10	<0.10	<0.3

Notes:

(a) Groundwater samples were analyzed fr PAHs by EPA Method 8310. Only detected compounds are provided in this table.
(b) Groundwater samples were analyzed for TPH by Washington State Method WTPH-D.
(c) "<" denotes analyte was not detected at the indicated detection limit.
(d) A field duplicate sample (location number 2001) was collected at well NMW-13 .

TABLE 4A

COMPARISON OF GROUNDWATER ANALYTICAL RESULTS FOR MONITORING WELL NMW-13
Former Griffin Wheel Brass Foundry

Analytes	Sampling Event	
	September 1992	First Quarter (February and March 1993)
PAH Analytes (μg/L)[a]		
Acenaphthene	<0.50[b]	<0.51/0.84[c]
Fluorene	<0.10	0.27/0.44
Phenanthrene	2.9	0.37/0.16
Anthracene	0.064	0.099/0.085
Fluoranthene	4.3	0.73/0.84
Pyrene	4.0	0.69/0.45
TPH (mg/L)	<1.0[d]	0.7/0.8[e]

Notes:

(a) Groundwater samples were analyzed for PAHs by EPA Method 8310. Only detected compounds are provided in this table.
(b) "<" denotes analyte was not detected at the indicated detection limit.
(c) A field duplicate sample was collected during this sampling event. The second number in the table represents the sample duplicate analytical result.
(d) The groundwater sample collected during this event was analyzed for TPH by Washington State Method WTPH-418.1.
(e) Groundwater samples collected during the first quarter were analyzed for TPH by Washington State Method WTPH-D.

Attachment 3

Groundwater Purge and Sample Forms

GROUNDWATER PURGE AND SAMPLE FORMS

February 1993 Sampling Event

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMOCO WELL NUMBER: NMW-9

PROJECT NUMBER: 1SEC61.CO PERSONNEL: RHS / JAR

STATIC WATER LEVEL (FT): 33.23 MEASURING POINT DESCRIPTION: top of monument

WATER LEVEL MEASUREMENT METHOD: sclinst PURGE METHOD: pump

TIME START PURGE: 1202 PURGE DEPTH (FT)

TIME END PURGE: 1222

TIME SAMPLED: 1225

COMMENTS: No product observed in well
Raised pump = 6 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) (2)	2	6	=	CASING VOLUME (GAL)
	44.0		33.23		10.77		0.16	0.64	1.44		1.72

TIME	1204	1206	1208	1211	1214	1216	1220
VOLUME PURGED (GAL)	0.5	1.5	3.0	4.5	6.0	7.5	9.0
PURGE RATE (GPM)							
TEMPERATURE (°C)	12.9	12.5	12.5	12.6	12.7	12.8	12.8
pH	6.77	6.75	6.70	6.65	6.61	6.60	6.59
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	187	194	188	188	188	188	188
DISSOLVED OXYGEN (mg/L)							
eH(MV)Pt-AgCl ref.							
TURBIDITY/COLOR	MEDIUM YELLOW/GRAY	→	→	LOW GRAY	→	→	CLEAR
ODOR	NONE	→	→	→	→	→	→
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO	→	→	→	→	→	→

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-8

PROJECT NUMBER: 926061.00 PERSONNEL: RHS/JAR

SAMPLE DATA:

TIME SAMPLED: 1225 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	GL	No	No	1-L	No	No	Yes	8310	
	1	GL	No	No	1-L	No	No	Yes	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈10 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F)): 34°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form Date: 8/12/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMOCO WELL NUMBER: MW-9

PROJECT NUMBER: 926061.00 PERSONNEL: BAO/JAR

STATIC WATER LEVEL (FT): 34.06 MEASURING POINT DESCRIPTION: top of casing

WATER LEVEL MEASUREMENT METHOD: Solinst PURGE METHOD: Pump

TIME START PURGE: 1330 PURGE DEPTH (FT)

TIME END PURGE: 1422

TIME SAMPLED: 1425

COMMENTS: Lowered strip with absorbent material into well - no product observed. Placed absorbent material into with water level probe - No product observed. Raised pump approximately 3 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	(4)	6	=	CASING VOLUME (GAL)
	345.25		34.06		11.29		0.16	0.64	1.44		7.23 (21)

TIME	1334	1339	1346	1354	1405	1417	1420	1422
VOLUME PURGED (GAL)	2.5	4.0	7.5	10	14	18	21	23
PURGE RATE (GPM)								
TEMPERATURE (°C)	11.7	12.4	12.1	12.0	11.9	11.8	11.7	
pH	6.79	6.63	6.66	6.65	6.60	6.67	6.66	
SPECIFIC CONDUCTIVITY (mS/cm micromhos/cm) (uncorrected)	341	340	342	344	339	335	332	
DISSOLVED OXYGEN (mg/L)								
eH(MV)Pt-AgCl ref.								
TURBIDITY/COLOR	LOW YELLOW		CLEAR					
ODOR	NONE							
DEPTH TO WATER DURING PURGE (FT)								
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?	NO							

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: MW-9

PROJECT NUMBER: 92C61.00 PERSONNEL: RHS JAR

SAMPLE DATA:

TIME SAMPLED: 1435 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: PUMP

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	GL	No	No	1-L	No	No	Yes	8310	
	1	GL	No	No	1-L	No	No	Yes	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈22 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F)): 35°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTAD WELL NUMBER: NMW-1C

PROJECT NUMBER: 92-C61.CC PERSONNEL: RHS/JAR

STATIC WATER LEVEL (FT): 33.90 MEASURING POINT DESCRIPTION: top of MONUMENT

WATER LEVEL MEASUREMENT METHOD: Solinst PURGE METHOD: pump

TIME START PURGE: 1039 PURGE DEPTH (FT)

TIME END PURGE: 1058

TIME SAMPLED: 1100

COMMENTS: No product observed

Bailed pump @ 5-6 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) (2)	2	6	=	CASING VOLUME (GAL)
	44.3		33.90		10.4		0.16	0.64	1.44		1.66

TIME	1040	1044	1047	1051	1054	1057	
VOLUME PURGED (GAL)	0.5	1.5	3.0	4.5	5.0	6.5	
PURGE RATE (GPM)							
TEMPERATURE (°C)	11.0	11.7	12.0	12.4	12.6	12.3	
pH	6.07	6.11	6.16	6.28	6.38	6.43	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	236	230	229	228	229	228	
DISSOLVED OXYGEN (mg/L)							
eH(MV)Pt-AgCl ref.							
TURBIDITY/COLOR	MEDIUM YELLOW/	BROWN	→	LOW AMBER	→	LOW GRAY	
ODOR	NONE	→	→	→	→	→	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO	→	→	→	→	→	

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 2/11/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTAD WELL NUMBER: NMW-10

PROJECT NUMBER: 926061.CC PERSONNEL: RHS / JAR

SAMPLE DATA:

TIME SAMPLED: 1100 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: PUMP

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	GL	NO	NO	1-L	LOW	GRAY	YES	8310	
	1	GL	NO	NO	1-L	LOW	GRAY	YES	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈70 COMMENTS:

DISPOSAL METHOD: Drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F)): 32°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-11

PROJECT NUMBER: 926001.00 PERSONNEL: RHS / JAR

STATIC WATER LEVEL (FT): 32.67 MEASURING POINT DESCRIPTION: top of NORTHWEST

WATER LEVEL MEASUREMENT METHOD: sounder PURGE METHOD: pump

TIME START PURGE: 1117 PURGE DEPTH (FT)

TIME END PURGE: 1135

TIME SAMPLED: 1135

COMMENTS: Collected transfer blank (3740WW000002CC0.010) (1145)
No product observed
Bailed pump @ 6-7 feet
Sample VOA's collected in triplicate for lab QA/QC.

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN)			=	CASING VOLUME (GAL)
							(2)	2	6		
	44.2		32.67		11.53		0.16	0.64	1.44		1.84

TIME	1118	1120	1123	1126	1129	1133	
VOLUME PURGED (GAL)	0.5	1.5	3.0	5.0	7.0	9.0	
PURGE RATE (GPM)							
TEMPERATURE (°C)	12.3	12.5	12.5	12.6	12.3	12.5	
pH	6.72	6.82	6.86	6.86	6.80	6.84	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	482	447	448	447	448	449	
DISSOLVED OXYGEN (mg/L)							
eH(MV)Pt-AgCl ref.							
TURBIDITY/COLOR	MEDIUM YELLOW	→	→	LOW YELLOW	LOW GRAY	→	
ODOR	NONE	→	→	→	→	→	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO	→	→	→	→	→	

F-43.1 (4-88)
ISGO.I

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: MW-11

PROJECT NUMBER: 926061.00 PERSONNEL: RHS/JAR

SAMPLE DATA:

TIME SAMPLED: 1135 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: PUMP

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	3	GL	NO	NO	1-L	LOW	GRAY	YES	8310	
	3	GL	NO	NO	1-L	LOW	GRAY	YES	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈10 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F): 33°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form

Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED
WELL NUMBER: NMW-12
PROJECT NUMBER: 926061.00
PERSONNEL: RHS/JAR

STATIC WATER LEVEL (FT): 33.03
MEASURING POINT DESCRIPTION: top of monument
WATER LEVEL MEASUREMENT METHOD: solinst
PURGE METHOD: pump
TIME START PURGE: 0950
PURGE DEPTH (FT)
TIME END PURGE: 1010
TIME SAMPLED: 1010
COMMENTS: No product observed
Raised pump approximately 6-7 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) (2)	2	6	=	CASING VOLUME (GAL)
	44.1		33.03		11.07		0.16	0.64	1.44		1.77

TIME	0952	0955	0958	1002	1006		
VOLUME PURGED (GAL)	0.5	1.5	3.0	5.0	7.0		
PURGE RATE (GPM)							
TEMPERATURE (°C)	10.8	11.3	11.8	11.8	11.8		
pH	6.42	6.59	6.66	6.67	6.62		
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	300	201	200	303	302		
DISSOLVED OXYGEN (mg/L)							
eH(MV)Pt-AgCl ref.							
TURBIDITY/COLOR	CLEAR	→	→	→	→		
ODOR	NONE	→	→	→	→		
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO	→	→	→	→		

F-43.1 (4-88)
ISGO.I

Groundwater Purge and Sample Form Date: 2/14/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMCO WELL NUMBER: NMW-12

PROJECT NUMBER: 920061.00 PERSONNEL: RHS/JAR

SAMPLE DATA:

TIME SAMPLED: 1015 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: Pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	GL	No	No	1-L	No	No	Yes	8310	
	1	GL	No	No	1-L	No	No	Yes	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈ 70 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F)): 32°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form

Date: 9/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-13

PROJECT NUMBER: 926-4100 PERSONNEL: RHS / JAR

STATIC WATER LEVEL (FT): 31.6 MEASURING POINT DESCRIPTION: top of MONUMENT

WATER LEVEL MEASUREMENT METHOD: String PURGE METHOD: Pump

TIME START PURGE: 1512 PURGE DEPTH (FT) raised pump = 3 feet

TIME END PURGE: 1555

TIME SAMPLED: 1555 collected duplicate 20016U202000000010 (AT 1605)

COMMENTS: Stuck string with absorbent material into well
The material contained product - Well was cleaned
with absorbent material Absorbent material was placed
on string in a mop arrangement This was done 4 times

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	2	(6)	=	CASING VOLUME (GAL)
	42.8		31.6		11.2		0.16	0.64	1.44		16.13 (45)

TIME	1520	1526	1531	1535	1540	1545	1550	1555
VOLUME PURGED (GAL)	5	10	15	20	26	35	40	47
PURGE RATE (GPM)								
TEMPERATURE (°C)	11.9	13.3	13.1	13.2	13.2	13.1	13.1	13.0
pH	6.71	6.60	6.59	6.64	6.55	6.62	6.62	6.61
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected) µS/CM	331	314	313	312	309	310	309	305
DISSOLVED OXYGEN (mg/L)								
eH(MV)Pt-AgCl ref.								
TURBIDITY/COLOR	CLEAR							
ODOR	NONE							
DEPTH TO WATER DURING PURGE (FT)								
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?	NO							

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-13

PROJECT NUMBER: 9260061.00 PERSONNEL: RHS / JAR

SAMPLE DATA:

TIME SAMPLED: 1555 COMMENTS: Duplicate sample collected 200IGU1201C00000.010 time of 1605

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	Gl	No	No	1-L	No	No		8310	
	1	Gl	No	No	1-L	No	No		WTPH-D	
	1	Gl	No	No	1-L	No	No		8310	
	1	Gl	No	No	1-L	No	No		WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈48 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F)): 33°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

F-43.2 (4-88)

Groundwater Purge and Sample Form

Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED
WELL NUMBER: NMW-14
PROJECT NUMBER: 926C61.CO
PERSONNEL: RHS / JAR

STATIC WATER LEVEL (FT): 29.58
MEASURING POINT DESCRIPTION: top of Monument
WATER LEVEL MEASUREMENT METHOD: solinst
PURGE METHOD: pump
TIME START PURGE: 0900
PURGE DEPTH (FT)
TIME END PURGE: 0923
TIME SAMPLED: 0935

COMMENTS: Calibrated pH meter pH 7 = 7.09
No product observed
Raised pump approximately 10-11 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	2	6	=	CASING VOLUME (GAL)
	44.1		29.58		14.52		0.16	0.64	1.44		2.32

TIME	0903	0907	0912	0914	0923		
VOLUME PURGED (GAL)	1.5	3.0	5.0	7.0	9.0		
PURGE RATE (GPM)							
TEMPERATURE (°C)	9.8	10.9	11.1	11.3	11.4		
pH	6.33	6.67	6.73	6.76	6.74		
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	346	319	316	312	318		
DISSOLVED OXYGEN (mg/L)							
eH(MV)Pt-AgCl ref.							
TURBIDITY/COLOR	MEDIUM YELLOW/BROWN	→	LOW YELLOW	→	→		
ODOR	NONE	→	→	→	→		
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO	→	→	→	→		

Groundwater Purge and Sample Form Date: 2/17/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-14

PROJECT NUMBER: 926061.00 PERSONNEL: RHS/JAR

SAMPLE DATA:

TIME SAMPLED: 0925 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	GL	NO	No	1-L	LOW	Yellow	yes	8310	
	1	GL	NO	No	1-L	LOW	Yellow	yes	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ~10 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: SUNNY

TEMPERATURE (SPECIFY °C OR (°F)): 31°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

GROUNDWATER PURGE AND SAMPLE FORMS

March 1993 Sampling Event

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-2

PROJECT NUMBER: 92606100 PERSONNEL: DBD/JAR

STATIC WATER LEVEL (FT): 33.44 MEASURING POINT DESCRIPTION: top of Monument

WATER LEVEL MEASUREMENT METHOD: Solinst PURGE METHOD: pump

TIME START PURGE: 1130 PURGE DEPTH (FT)

TIME END PURGE: 1152

TIME SAMPLED: ~~1152~~ 1200

COMMENTS: NO product observed
raised pump 6-7 feet prior to purging

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) (2)	2	6	=	CASING VOLUME (GAL)
	44.0		33.44		10.56		0.16	0.64	1.44		1.69

TIME	1130	1135	1139	1144	1149	1152	
VOLUME PURGED (GAL)	0	1	2	3	4	5	
PURGE RATE (GPM)							
TEMPERATURE (°C)	12.9	12.8	12.9	12.8	13.3	13.1	
pH	5.99	6.03	6.08	6.02	6.05	6.00	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	187	191	188	188	188	188	
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	
TURBIDITY/COLOR	cloudy	cloudy	slightly cloudy gray	→	→	→	
ODOR	none	none	none	→	→	→	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED	0		1	1.7		3	
DEWATERED?	NO	→					

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMETEK WELL NUMBER: NMW-8

PROJECT NUMBER: 42660.00 PERSONNEL: DRD/JAR

SAMPLE DATA:

TIME SAMPLED: ~~1155~~ JR 1200 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
1	1	GL	No	No	1-L	LOW	Yes	Yes	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): 5.5 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: partly overcast

TEMPERATURE (SPECIFY °C OR (°F)): 44

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: ADDED WELL NUMBER: NMW-9A

PROJECT NUMBER: 926K1.00 PERSONNEL: JAR/DBD

STATIC WATER LEVEL (FT): 34.25 MEASURING POINT DESCRIPTION: TOC

WATER LEVEL MEASUREMENT METHOD: Solinst PURGE METHOD: pump

TIME START PURGE: 1255 PURGE DEPTH (FT)

TIME END PURGE: 1320

TIME SAMPLED: 1320

COMMENTS: no product observed
raised pump approximately 2 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	44.8		34.25		10.55		0.16	0.64	1.44		6.75

TIME	1255	1302	1305	1307	1311	1315	1320
VOLUME PURGED (GAL)	0	5	8	12	15	18	20
PURGE RATE (GPM)							
TEMPERATURE (°C)	13.3	13.3	13.3	13.4	13.5	13.4	13.5
pH	6.16	6.29	~~6.36~~ 6.34	6.35	6.37	6.34	6.33
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	372	371	368	364	354	346	338
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	X
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	X
TURBIDITY/COLOR	clear	clear	clear	clear	clear	clear	clear
ODOR	none	none	none	none	none	none	none
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO						

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-9

PROJECT NUMBER: 926061.00 PERSONNEL: DBD / JJR

SAMPLE DATA:

TIME SAMPLED: 1320 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump?

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
1	1	G1	No	No	1-L	NO	No	YES	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≥21 COMMENTS:

DISPOSAL METHOD: drums onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: partly overcast

TEMPERATURE (SPECIFY °C OR (°F)): 46

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

F-43.2 (4-88)

Groundwater Purge and Sample Form Date: 2/12/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: MW-1C

PROJECT NUMBER: 926061.00 PERSONNEL: DBD/JAR

STATIC WATER LEVEL (FT): 34.15 MEASURING POINT DESCRIPTION: top of monument

WATER LEVEL MEASUREMENT METHOD: sr/inst PURGE METHOD: pump

TIME START PURGE: 1002 PURGE DEPTH (FT)

TIME END PURGE: 1030

TIME SAMPLED: 1030

COMMENTS: NO product observed
raised pump approximately 5-6 feet prior to purging Collect sample in triplicate for lab QA/QC

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN)			=	CASING VOLUME (GAL)
							(2)	2	6		
	24.3		34.15		10.15		0.16	0.64	1.44		1.624

TIME	1002	1006	1010	1013	1019	1030	
VOLUME PURGED (GAL)	0	1	2	2.5	3	5	
PURGE RATE (GPM)							
TEMPERATURE (°C)	11.5	12.1	12.2	12.2	12.2	12.0	
pH	5.85	6.00	6.00	5.99	5.96	6.06	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	236	237	239	239	238	238	
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	X
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	X
TURBIDITY/COLOR	slightly cloudy	cleaner	→	very slightly cloudy	INTERBED	→	
ODOR	none	none	→	none	→	→	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED	0						
DEWATERED?	NO	→	→	→	→	→	

Groundwater Purge and Sample Form Date: 8/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: ANSTED WELL NUMBER: NMW-1C

PROJECT NUMBER: 926061.00 PERSONNEL: DRD / JJR

SAMPLE DATA:

TIME SAMPLED: 1030 COMMENTS: Collect sample in triplicate for lab QA/QC.

DEPTH SAMPLED (FT): _____

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
1	3	GI	No	No	1-L	Yes Low	Yes	Yes	WTP 1-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): 5 COMMENTS: _____

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL): _____

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: _____

GENERAL:

WEATHER CONDITIONS: partly overcast

TEMPERATURE (SPECIFY °C OR (°F)): 70°

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? _____

cc: Project Manager: _____
Job File: _____
Other: _____

F-43.2 (4-88)

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMETEK WELL NUMBER: MW-11

PROJECT NUMBER: 926061.00 PERSONNEL: DBD / JAR

STATIC WATER LEVEL (FT): 32.88 MEASURING POINT DESCRIPTION: top of monument

WATER LEVEL MEASUREMENT METHOD: solinst PURGE METHOD: pump

TIME START PURGE: 1050 PURGE DEPTH (FT)

TIME END PURGE: 1113

TIME SAMPLED: 1115

COMMENTS: no product observed

raised pump @ 7.0 feet

Rinsate collected @ 1120 #3740 WW00002 10

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	2	6	=	CASING VOLUME (GAL)
	44.2		32.88		11.32		0.16	0.64	1.44		1.811

TIME	1050	1055	1059	1105	1107	1113	
VOLUME PURGED (GAL)	0	1	2	3	4	5	
PURGE RATE (GPM)							
TEMPERATURE (°C)	11.8	12.5	12.7	12.6	12.6	12.9	
pH	6.18	6.35	6.34	6.36	6.39	6.35	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	370	427	443	449	450	450	
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	
TURBIDITY/COLOR	Br cloudy	→	cloudy	cloudy	slightly cloudy	clear	
ODOR	none	→	none	none	none	none	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED	0		1		2		
DEWATERED?	NO	→				→	

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: ARCTED WELL NUMBER: NMW-11

PROJECT NUMBER: 926041.00 PERSONNEL: DRD/JAR

SAMPLE DATA:

TIME SAMPLED: 1115 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
1	1	GL	NO	NO	1-L	NO	NO	YES	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ≈5.5 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: partly cloudy

TEMPERATURE (SPECIFY °C OR (°F): 45

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

Groundwater Purge and Sample Form

Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-12

PROJECT NUMBER: 926061.00 PERSONNEL: DAD/JAR

STATIC WATER LEVEL (FT): 33.27 MEASURING POINT DESCRIPTION: Top of Monument

WATER LEVEL MEASUREMENT METHOD: Solinst PURGE METHOD: pump

TIME START PURGE: 0922 PURGE DEPTH (FT)

TIME END PURGE: 0945

TIME SAMPLED: 0945

COMMENTS: raised pump approximately 6 feet
No product observed

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2"	2	6	=	CASING VOLUME (GAL)
	44.1		33.27		10.83		0.16	0.64	1.44		1.73

TIME	0925	0928	0932	0935	0940	0945	
VOLUME PURGED (GAL)	0	2	2.5	3	4	6	
PURGE RATE (GPM)							
TEMPERATURE (°C)	10.9	11.3	11.4	11.7	11.8	11.8	
pH	6.20	6.29	6.48	6.47	6.47	6.44	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	259	257	256	257	257	257	
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	X
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	X
TURBIDITY/COLOR	clear slight	clear slight	clear slight	clear slight	clear	→	
ODOR	none	none	none	none	→	→	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED	0	1					
DEWATERED?	NO					↓	

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-12

PROJECT NUMBER: 926061.00 PERSONNEL: DBD/JAR

SAMPLE DATA:

TIME SAMPLED: 0945 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: PUMP

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
1	1	GL	NO	NO	1-L	NONE	NO	YES	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): 6.5 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: partly overcast

TEMPERATURE (SPECIFY °C OR (°F): 41

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other:

F-43.2 (4-88)

Groundwater Purge and Sample Form Date: 3/6/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-13A

PROJECT NUMBER: 926061.00 PERSONNEL: JAR/DBD

STATIC WATER LEVEL (FT): 32.2 MEASURING POINT DESCRIPTION: TOC

WATER LEVEL MEASUREMENT METHOD: Solinst PURGE METHOD: pump

TIME START PURGE: 1406 PURGE DEPTH (FT)

TIME END PURGE: 1500

TIME SAMPLED: 1500

COMMENTS: product observed Well was cleaned with absorbent material Absorbent material made into mop like - done 4 times collected duplicate sample (200) (gave time of 1505) pump was raised ~ 2-3 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	44.1		32.2		11.9		0.16	0.64	1.44		17.1

TIME	1406	1415	1433	1439	1446	1453	1500
VOLUME PURGED (GAL)	0	8	17	26	34.2	43	52
PURGE RATE (GPM)							
TEMPERATURE (°C)	13.4	13.8	13.6	13.5	14.0	13.8	13.5
pH	6.07	6.33	6.31	6.30	6.28	6.31	6.25
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	345	340	342	341	340	339	339
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	X
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	X
TURBIDITY/COLOR	Clear	clear	clear	→	→	→	→
ODOR	slight petroleum	→	→	→	→	→	→
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED	0	½	1	1½	2	2½	3
DEWATERED?	NO	~~½~~					

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: HMSFD WELL NUMBER: HMW-13

PROJECT NUMBER: 926061.00 PERSONNEL: DBD KJHR

SAMPLE DATA:

TIME SAMPLED: 1500 COMMENTS: Collected duplicate sample (sample ID -2001)

DEPTH SAMPLED (FT): _____

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
	1	G1	No	No	1-L	No	No	YES	WTPH-D	
	1	G1	No	No	1-L	No	No	YES	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): 52 gallons COMMENTS: _____

DISPOSAL METHOD: drums onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL): _____

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: _____

GENERAL:

WEATHER CONDITIONS: partly cloudy

TEMPERATURE (SPECIFY °C OR (°F)): 45

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? _____

cc: Project Manager: _____
Job File: _____
Other: _____

Groundwater Purge and Sample Form

Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: AMSTED WELL NUMBER: NMW-11

PROJECT NUMBER: 926041.00 PERSONNEL: DRD LJH

STATIC WATER LEVEL (FT): 27.5 MEASURING POINT DESCRIPTION: top of casing

WATER LEVEL MEASUREMENT METHOD: solinst PURGE METHOD: pump

TIME START PURGE: 820 PURGE DEPTH (FT)

TIME END PURGE: 855

TIME SAMPLED: 855

COMMENTS: Calibrated pH Meter
No product observed
raised pump = 11-12 feet

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2 / 2 / 6			=	CASING VOLUME (GAL)
	44.1		27.5		16.6		0.16	0.64	1.44		2.656

TIME	820	827	834	842	848	850	855
VOLUME PURGED (GAL)	0	2	2.5	4.5	6	7	8
PURGE RATE (GPM)							
TEMPERATURE (°C)	11	11.8	11.4	11.8	11.8	12	12.2
pH	6.64	6.63	6.58	6.51	6.5	6.49	6.48
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	314	310	304	313	300	299	297
DISSOLVED OXYGEN (mg/L)	X	X	X	X	X	X	X
eH(MV)Pt-AgCl ref.	X	X	X	X	X	X	X
TURBIDITY/COLOR	cloudy	Grey cloudy	Brown cloudy	cloudy	slightly cloudy	very slight	very slight yellow
ODOR	none		none	none		none	none
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED	(0)	—	1	1.75	2.5		3
DEWATERED?	NO						

F-43.1 (4-88)

ISGO.I

Groundwater Purge and Sample Form Date: 3/2/93 **Kennedy/Jenks Consultants**

PROJECT NAME: ATM257E7D WELL NUMBER: NMW-14

PROJECT NUMBER: 926061.00 PERSONNEL: DBD/JAR

SAMPLE DATA:

TIME SAMPLED: 0855 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT: pump

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
1	1	G1	NO	NO	1-L	LOW	Yellow	yes	WTPH-D	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): 8.5 COMMENTS:

DISPOSAL METHOD: drum onsite

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: ~~40~~

GENERAL:

WEATHER CONDITIONS: partly overcast

TEMPERATURE (SPECIFY (°C) OR (°F)): 40

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager:
Job File:
Other: